

MSOffice Excel – Part 4



Analyzing and Charting Financial Data



Objectives

- Use the PMT function to calculate a loan payment
- Create an embedded pie chart
- Apply styles to a chart
- Add data labels to a pie chart
- Format a chart legend
- Create a clustered column chart
- Create a stacked column chart

Objectives

- Create a line chart
- Create a combination chart
- Format chart elements
- Modify the chart's data source
- Add sparklines to a worksheet
- Format cells with data bars
- Insert a watermark

Visual Overview: Session 4.1

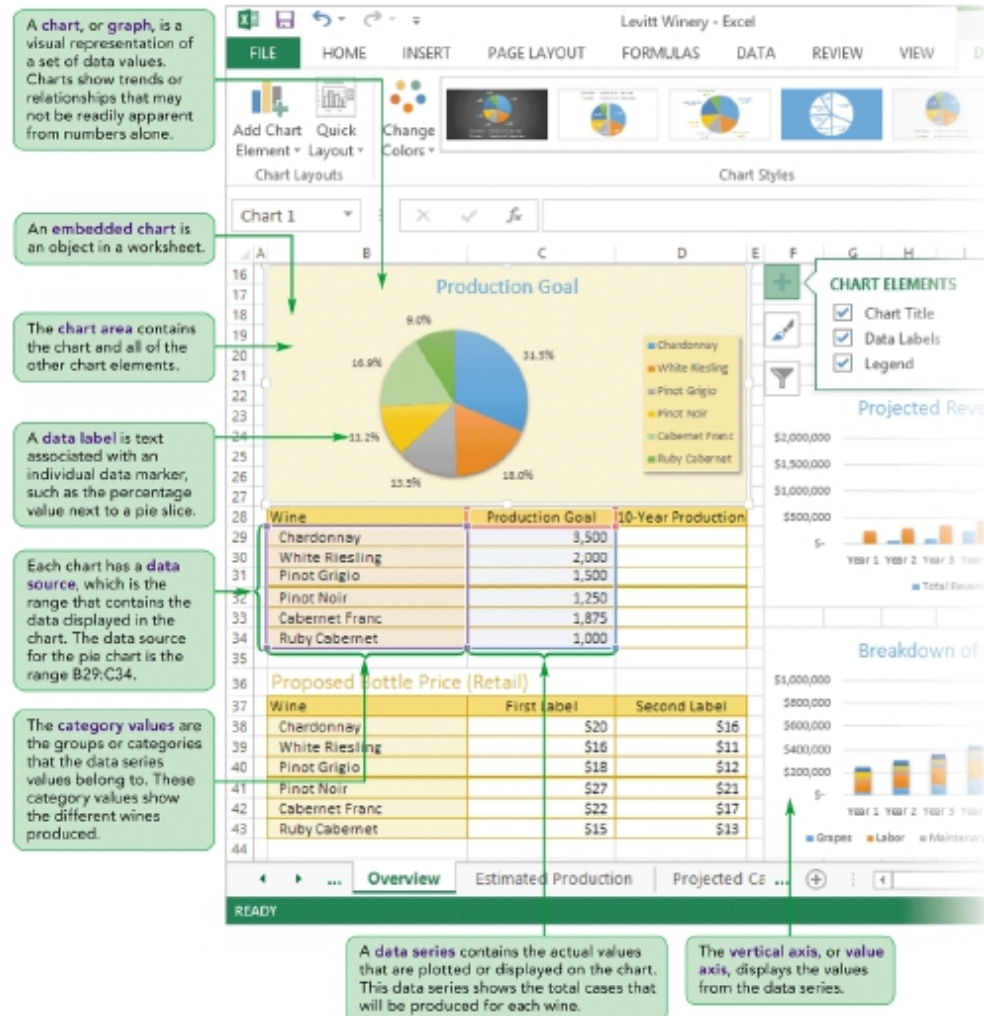


Chart Elements



Introduction to Financial Functions

- Excel provides a wide range of financial functions related to loans and investments.
- One of these is the **PMT function**, which can be used to calculate the installment payment and payment schedule required to completely repay a loan.
- Other loan functions include future value, present value, calculating the interest part of a payment, calculating the principle part of a payment, and the loan interest rate.

Financial Functions for Loans and Investments

Figure 4-1

Financial functions for loans and investments

Function	Description
<code>FV(rate, nper, pmt [, pv=0] [, type=0])</code>	Calculates the future value of an investment, where <i>rate</i> is the interest rate per period, <i>nper</i> is the total number of periods, <i>pmt</i> is the payment in each period, <i>pvt</i> is the present value of the investment, and <i>type</i> indicates whether payments should be made at the end of the period (0) or the beginning of the period (1)
<code>PMT(rate, nper, pv [, fv=0] [, type=0])</code>	Calculates the payments required each period on a loan or an investment, where <i>fv</i> is the future value of the investment
<code>IPMT(rate, per, nper, pv [, fv=0] [, type=0])</code>	Calculates the amount of a loan payment devoted to paying the loan interest, where <i>per</i> is the number of the payment period
<code>PPMT(rate, per, nper, pv [, fv=0] [, type=0])</code>	Calculates the amount of a loan payment devoted to paying off the principal of a loan
<code>PV(rate, nper, pmt [, fv=0] [, type=0])</code>	Calculates the present value of a loan or an investment based on periodic, constant payments
<code>NPER(rate, pmt, pv [, fv=0] [, type=0])</code>	Calculates the number of periods required to pay off a loan or an investment
<code>RATE(nper, pmt, pv [, fv=0] [, type=0])</code>	Calculates the interest rate of a loan or an investment based on periodic, constant payments

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Working with Financial Functions

- Cost of a loan to the borrower is largely based on three factors:
 - Principal:** amount of money being loaned
 - Interest:** amount added to the principal by the lender
 - Calculated as **simple interest** or as **compound interest**
 - Time required to pay back the loan

Explanation of Function Use

Function	Use to determine...
FV(future value)	How much an investment will be worth after a series of monthly payments at some future time
PMT(payment)	How much you have to spend each month to repay a loan or mortgage within a set period of time
IPMT(interest payment)	How much of your monthly loan payment is used to pay the interest
PPMT(principal payment)	How much of your monthly loan payment is used for repaying the principal
PV(present value)	Largest loan or mortgage you can afford given a set monthly payment
NPER(number of periods)	How long it will take to pay off a loan with constant monthly payments

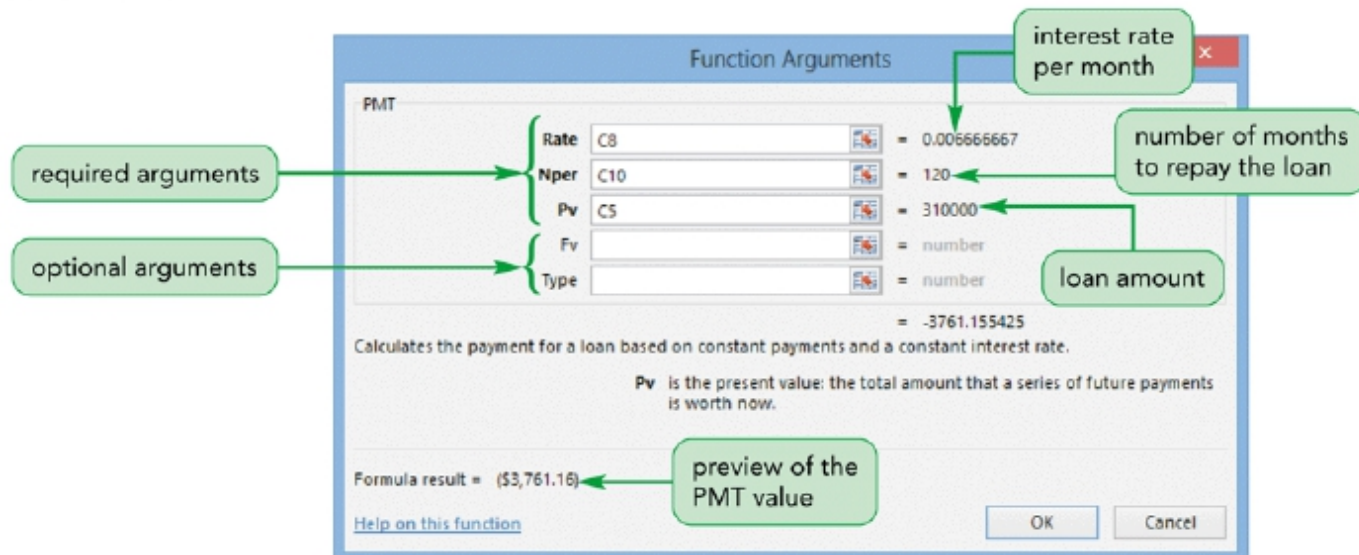
PMT Function Variables

- To calculate the costs associated with a loan, you must have the following information:
 - The annual interest rate
 - The number of payment periods per year
 - The length of the loan in terms of the total number of payment periods
 - The amount being borrowed
 - When loan payments are due

Using the PMT Function

`PMT(rate, nper, pv, [fv=0] [type=0])`

Figure 4-2 Function Arguments dialog box for the PMT function



Using the PMT Function

Figure 4-3 Monthly and annual costs of the business loan

The screenshot shows an Excel spreadsheet with the following data:

	B	C	D	E	F	G	H
1	Levitt Winery						
2	Business Plan Overview						
3							
4	Business Loan Request						
5	Loan Amount (PV)	\$	310,000				
6	Annual Interest Rate		8.00%				
7	Payments per Year		12				
8	Interest Rate per Period (RATE)		0.67%				
9	Number of Years		10				
10	Total Payments (NPER)		120				
11							
12	Monthly Payment		(\$3,761.16)				
13	Annual Total		(\$45,133.87)				
14							
15	Estimated Production						
16							

Callouts in the image:

- PMT function calculates the loan payment (points to the formula bar: `=PMT(C8,C10,C5)`)
- monthly payment is negative to indicate an expense (points to the Monthly Payment cell)
- annual payment (points to the Annual Total cell)

Excel Charts

- Charts show trends or relationships in data that are easier to see in a graphic representation rather than viewing the actual numbers or data.
- When creating a chart, remember that your goal is to convey important information that would be more difficult to interpret from columns of data in a worksheet.

Choosing the Right Chart

Chart	When to Use
Pie charts	Small number of categories; easy to distinguish relative sizes of slices
Column or bar chart	Several categories
Line charts	Categories follow a sequential order
XY scatter charts	To plot two numeric values against one another
Custom chart	Available charts don't meet your needs

Communicating Effectively with Charts

- Keep it simple
- Focus on the message
- Limit the number of data series
- Use gridlines in moderation
- Choose colors carefully
- Limit chart to a few text styles

4 Steps for Creating Excel Charts

- Select the range containing the data you want to chart.
- On the INSERT tab, in the Charts group, click the Recommended Chart button or a chart type button, and then click the chart you want to create (or click the Quick
- Analysis button, click the CHARTS category, and then click the chart you want to create).
- On the CHART TOOLS DESIGN tab, in the Location group, click the Move Chart button, select whether to embed the chart in a worksheet or place it in a chart sheet, and then click the OK button.

Creating an Excel Chart

- Select a range to use as chart's data source

Figure 4-5 Selected chart data source

	A	B	C	D	E	F	G
27							
28		Wine	Production Goal (Cases)	10-Year Production			
29		Chardonnay	3,500				
30		Riesling	2,000				
31		Pinot Grigio	1,500				
32		Pinot Noir	1,250				
33		Cabernet Franc	1,875				
34		Ruby Cabernet	1,000				
35							
36		Proposed Bottle Price (Retail)					
37		Wine	First Label	Second Label			
38		Cha		\$16			
39		Riesling		\$11			
40		Pinot Grigio	\$18	\$12			
41		Pinot Noir	\$27	\$21			
42		Cabernet Franc	\$22	\$17			
43		Ruby Cabernet	\$15	\$13			
44							
45							

READY AVERAGE: 18

Creating an Excel Chart

- Select chart type that best represents the data
 - Use one of 53 built-in charts organized into 10 categories, or...
 - Create custom chart types based on built-ins

Figure 4-6 Excel chart types

Chart Type	Description
Column	Compares values from different categories. Values are indicated by the height of the columns.
Line	Compares values from different categories. Values are indicated by the height of the lines. Often used to show trends and changes over time.
Pie	Compares relative values of different categories to the whole. Values are indicated by the areas of the pie slices.
Bar	Compares values from different categories. Values are indicated by the length of the bars.
Area	Compares values from different categories. Similar to the line chart except that areas under the lines contain a fill color.
X Y (Scatter)	Shows the patterns or relationship between two or more sets of values. Often used in scientific studies and statistical analyses.
Stock	Displays stock market data, including the high, low, opening, and closing prices of a stock.
Surface	Compares three sets of values in a three-dimensional chart.
Radar	Compares a collection of values from several different data sets.
Combo	Combines two or more chart types to make the data easy to visualize, especially when the data is widely varied.

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Inserting a Pie Chart with the Quick Analysis Tool

- After you select an adjacent range to use as a chart's data source, the Quick Analysis tool appears. It includes a category for creating charts. The CHART category lists recommended chart types, which are the charts that are most appropriate for the data source you selected.

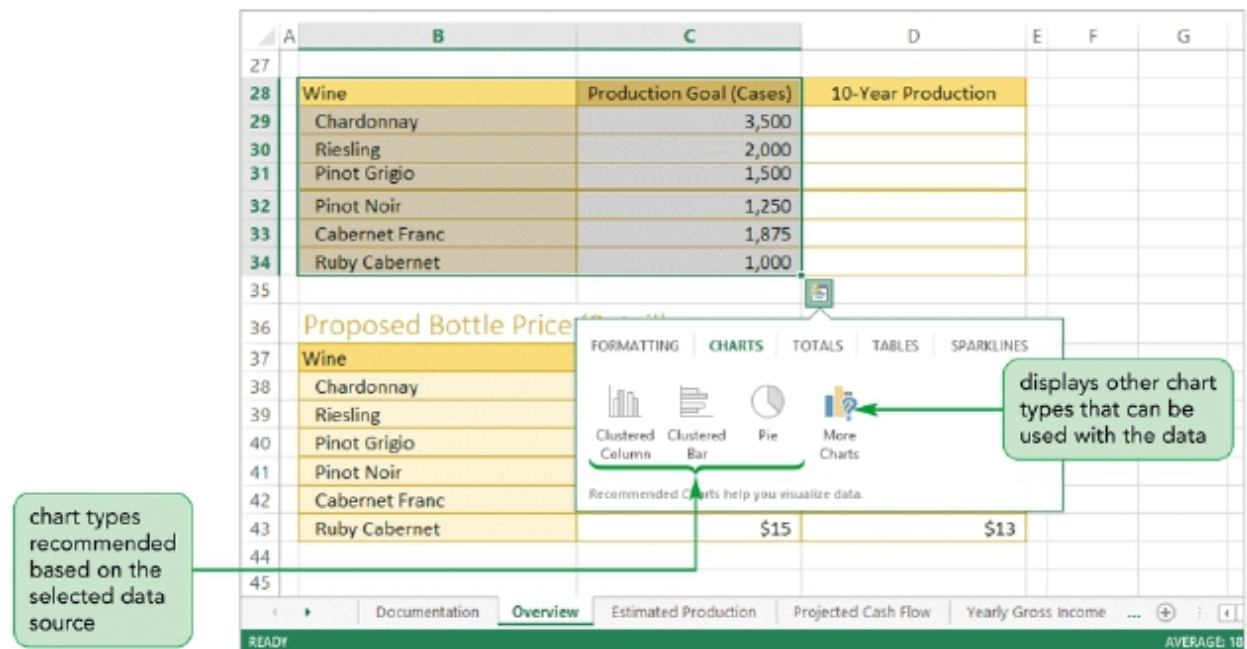
To create a pie chart with the Quick Analysis tool

- Make sure the correct range is selected.
- Click the Quick Analysis button in the lower-right corner of the selected range
- Click the CHARTS category.
 - The chart types you will most likely want to use with the selected data source are listed.
- Click Pie to select the pie chart.

CHARTS Category of the Quick Analysis Tool

Figure 4-8

CHARTS category of the Quick Analysis tool



Moving and Resizing Charts

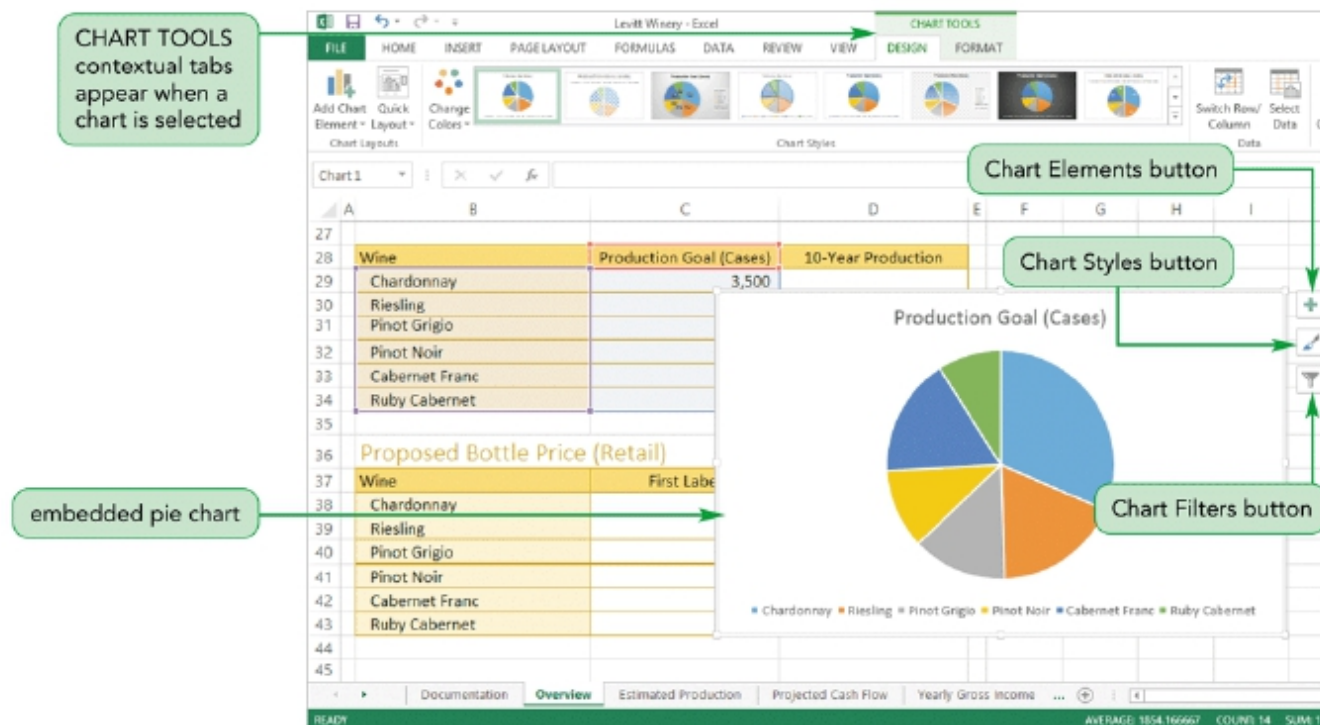
- Excel charts are either placed in their own chart sheets or embedded in a worksheet.
- When you create a chart, it is embedded in the worksheet that contains the data source.
- Selecting the chart displays a **selection box** (used to move or resize the object)
 - To move the chart, drag selection box to new location in worksheet
 - To resize the chart, drag a **sizing handle**

Choosing a Chart Style

- Recall that a style is a collection of formats that are saved with a name and can then be applied at one time.
- In a chart, the format of the chart title, the location of the legend, and the colors of the pie slices are all part of the default chart style.
- You can quickly change the appearance of a chart by selecting a different style from the Chart Styles gallery.

- Choose location of the legend, and format it using tools on Chart Tools Layout tab

Figure 4-9 Pie chart in the Overview worksheet

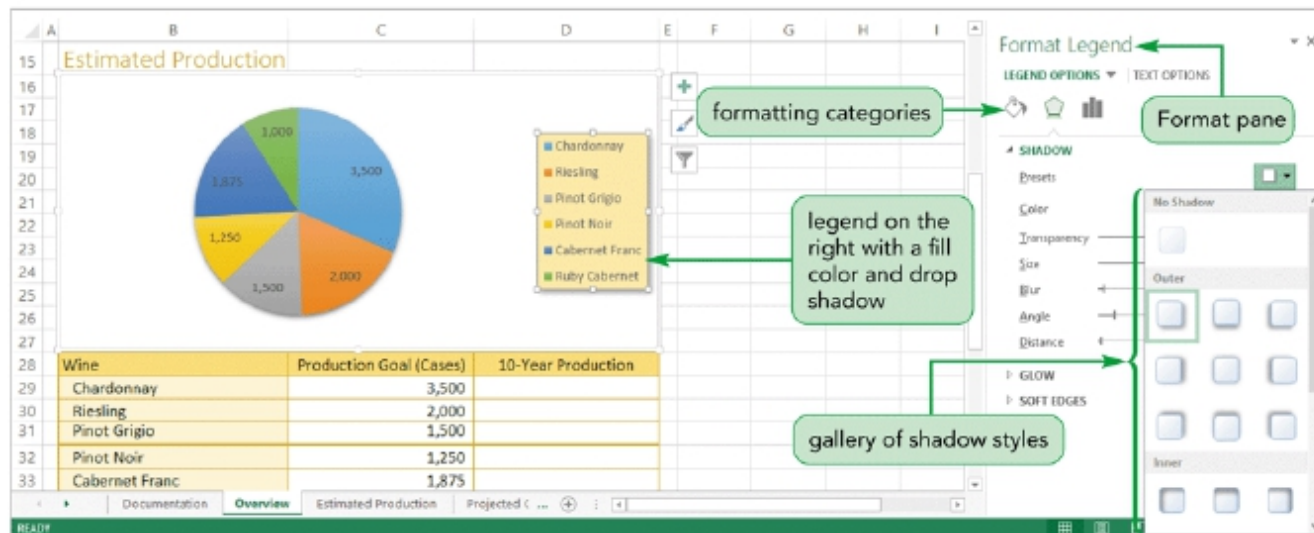


Formatting the Pie Chart Legend

- You can fine-tune a chart style by formatting individual chart elements. From the Chart Elements button, you can open a submenu for each element that includes formatting options, such as the element's location within the chart.
- You can also open a Format pane, which has more options for formatting the selected chart element.

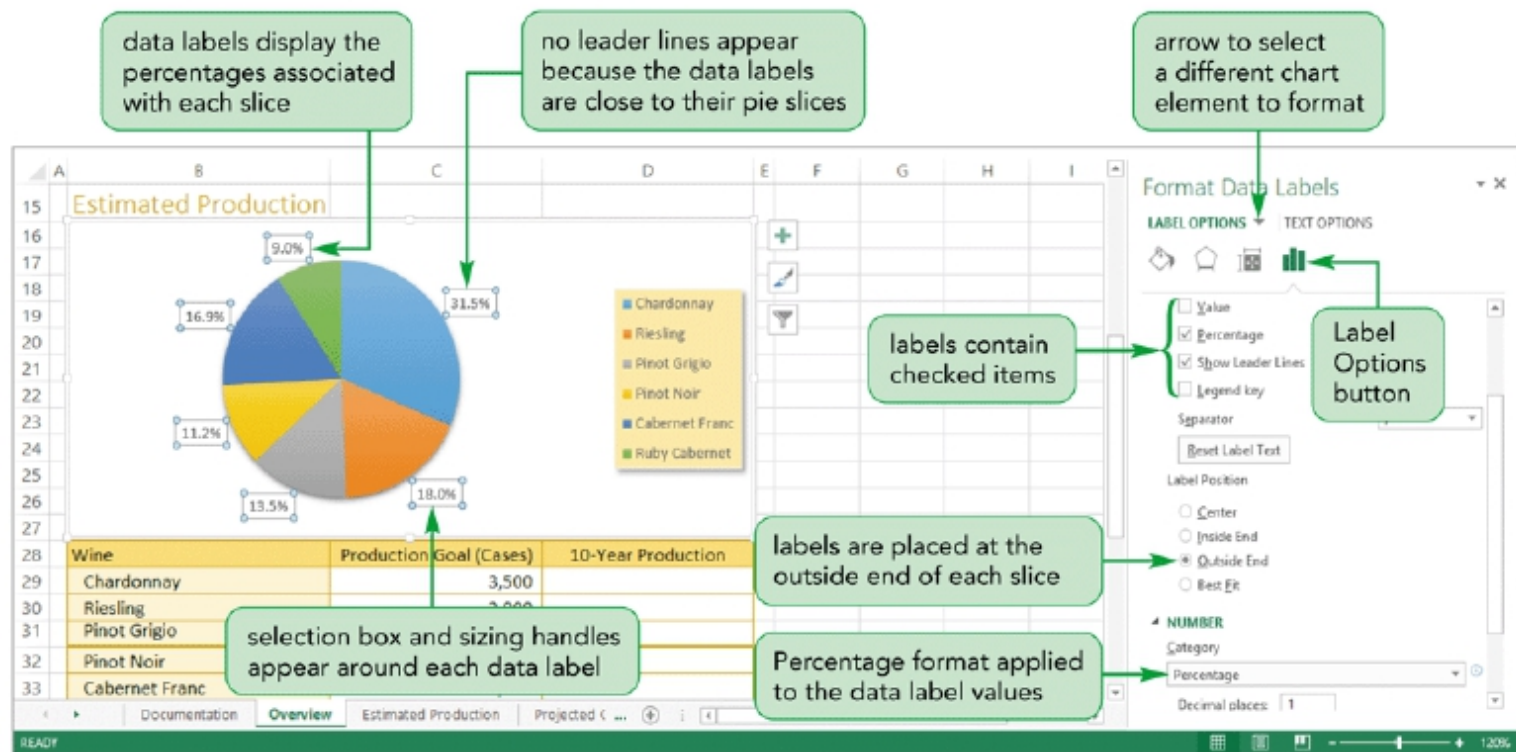
Formatted Chart Legend

Figure 4-13 Formatted chart legend



Formatting Pie Chart Data Labels

Figure 4-14 Formatted data labels



Formatting the Chart Area

- The chart's background, which is called the chart area, can also be formatted using fill colors, border styles, and special effects such as drop shadows and blurred edges.
- The chart area fill color used in the pie chart is white, which blends in with the worksheet background.

Designing a Pie Chart

- **Exploded pie charts**
 - Move one slice away from the others
 - Useful for emphasizing one category above all of the others

Performing What-If Analyses and Filtering with Charts

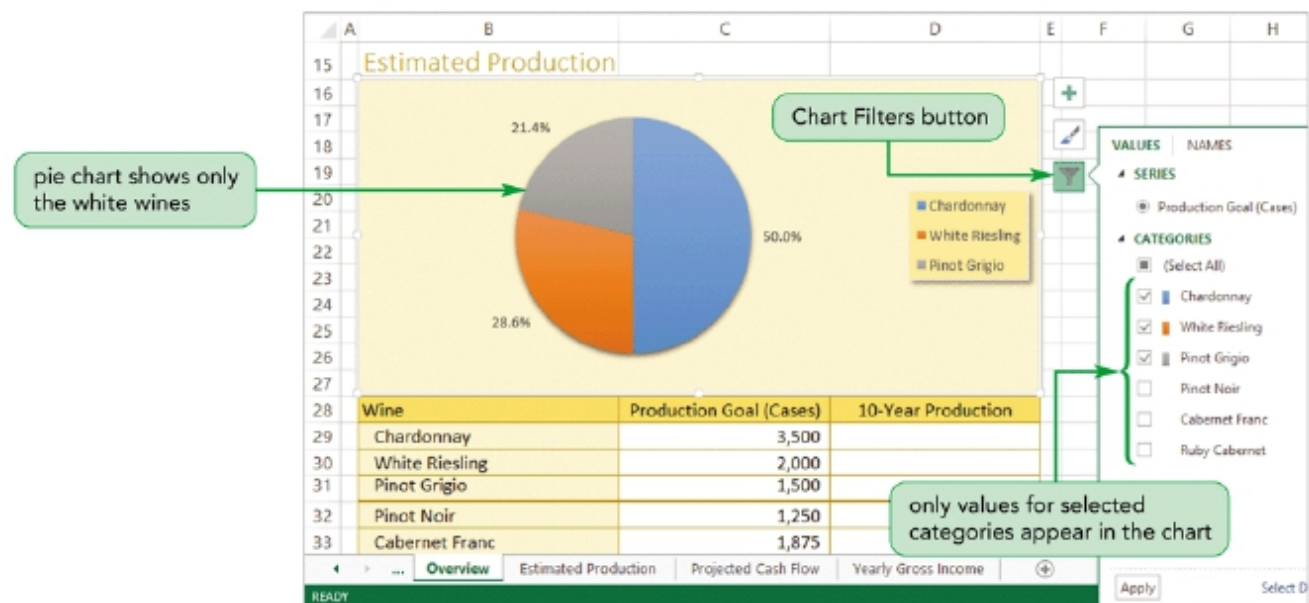
- A chart is linked to its data source, and as changes are made to the data source the changes translate to the chart allowing a visual representation of the What-if changes.
- Filtering is another type of what-if analysis that limits the data to a subset of the original values in a process.

Creating a Column Chart

- **Column chart**
 - Displays values in different categories as columns
 - Height of each column is based on its value
- **Bar chart**
 - Column chart turned on its side
 - Length of each bar is based on its value

Filtered Pie Chart

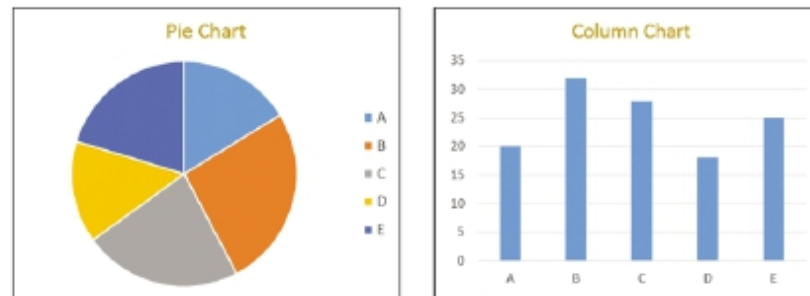
Figure 4-16 Filtered pie chart



Charts vs Pie Charts

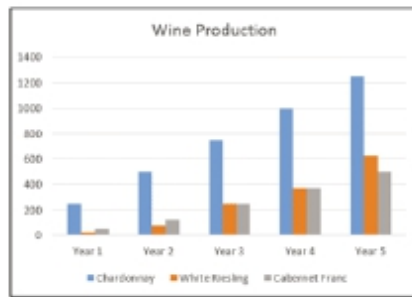
- Column/bar charts are superior to pie charts
 - For large number of categories or categories close in value
 - Easier to compare height or length than area
 - Can be applied to wider range of data
 - Can include several data series (pie charts usually show only one data series)

Figure 4-17 Data displayed as a pie chart and a column chart

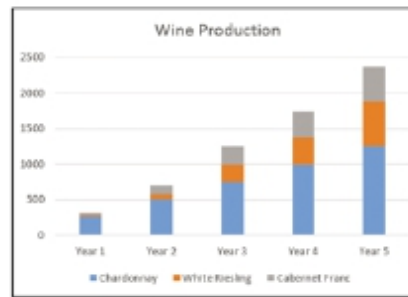


Comparing Column Chart Subtypes

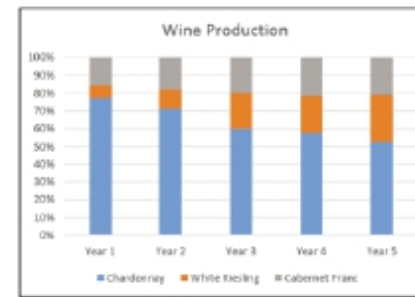
Figure 4-18 Column chart subtypes



Clustered Column



Stacked Column



100% Stacked Column

Inserting a Column Chart

- Select data source
- Select type of chart to create
- Move and resize the chart
- Change chart's design, layout, and format by:
 - Selecting one of the chart styles, or
 - Formatting individual chart elements

Moving a Chart to a Different Worksheet

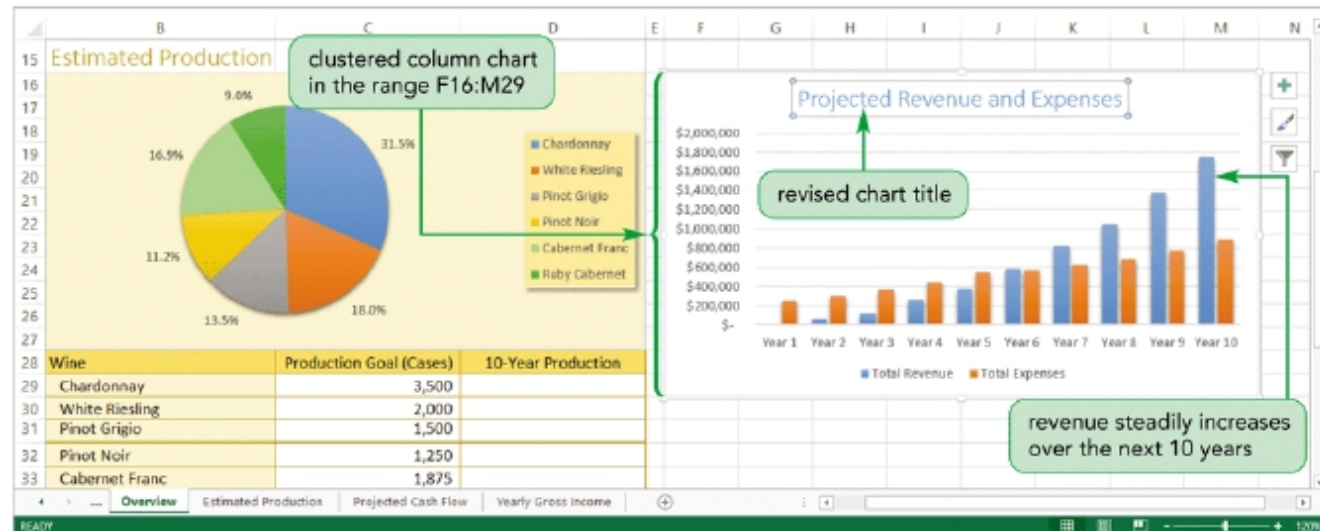
- Move Chart dialog box provides options for moving charts

Editing the Axis Scale and Text

- Range of values (**scale**) of an axis is based on values in data source
- Vertical (value) axis: range of series values
- Horizontal (category) axis: category values
- **Primary** and **secondary axes** can use different scales and labels
- Add descriptive axis titles if axis labels are not self-explanatory (default is no titles)

Changing and Formatting a Chart Title

Figure 4-20 Column chart



Session 4.2 Visual Overview

The SPARKLINE TOOLS DESIGN contextual tab provides commands to format sparklines.

A **sparkline** is a chart that is displayed within a cell. You can create line, column, and win/loss sparklines.

Line sparklines can contain data markers to identify the high and low points, negative points, first and last points, and all points.

These column sparklines have been ungrouped and formatted individually.

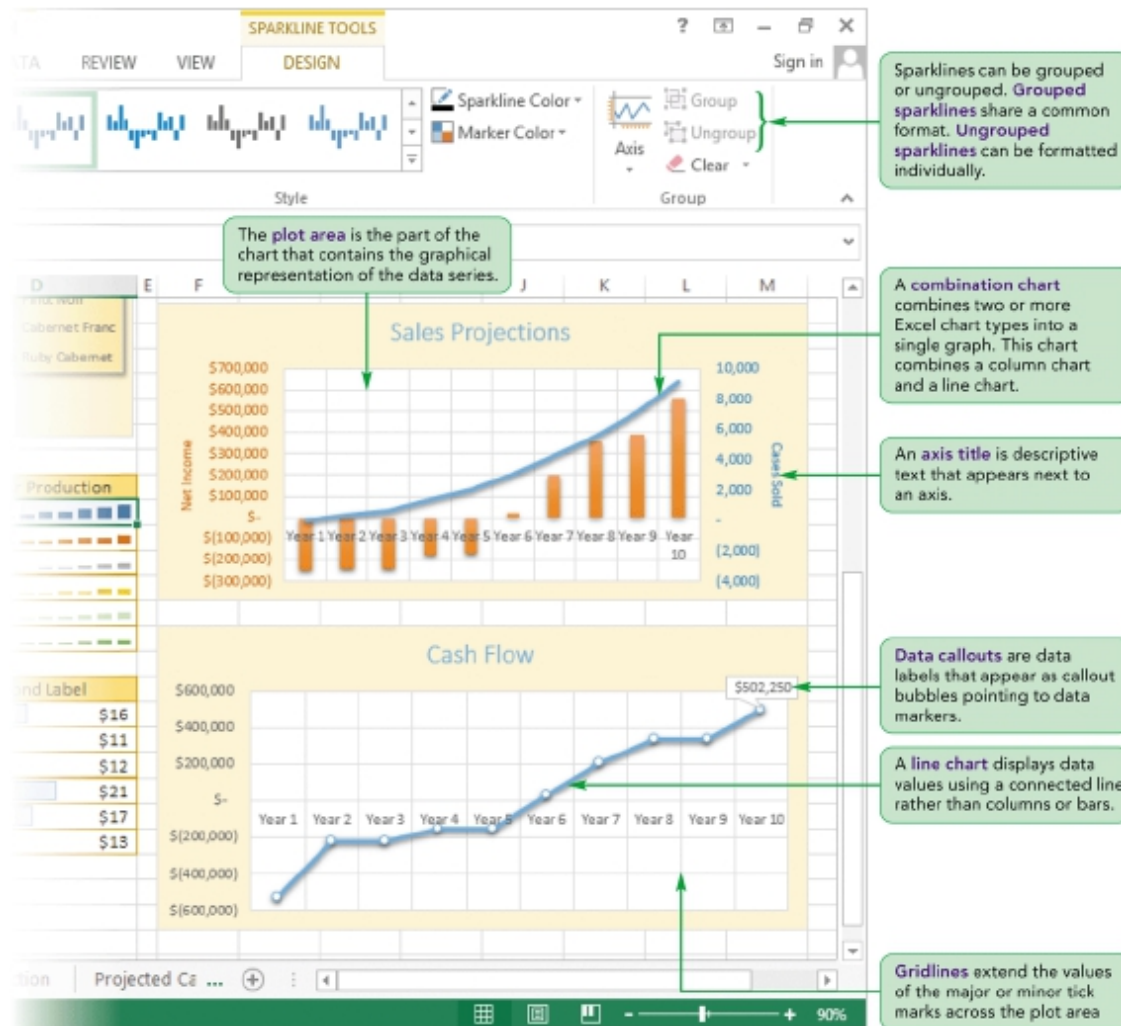
A **data bar** is a conditional format that adds a horizontal bar to the background of a cell proportional in length to the cell's value.

The screenshot shows the SPARKLINE TOOLS DESIGN tab in Excel 2013. The ribbon includes options for Edit Data, Sparkline Type (Line, Column, Win/Loss), and Show (High Point, Low Point, Negative Points, First Point, Last Point, Markers). The worksheet displays a pie chart, a line sparkline, and several column sparklines. A data bar is also visible in cell D29.

Wine	Production Goal (Cases)	10-Year Production	Net Income
Chardonnay	3,500		\$700,000
White Riesling	2,000		\$600,000
Pinot Grigio	1,500		\$500,000
Pinot Noir	1,250		\$400,000
Cabernet Franc	1,875		\$300,000
Ruby Cabernet	1,000		\$200,000
			\$100,000
			\$0
			\$(100,000)
			\$(200,000)
			\$(300,000)

Wine	First Label	Second Label	Net Income
Chardonnay	\$20	\$16	\$600,000
White Riesling	\$16	\$11	\$400,000
Pinot Grigio	\$18	\$12	\$200,000
Pinot Noir	\$27	\$21	\$0
Cabernet Franc	\$22	\$17	\$(200,000)
Ruby Cabernet	\$15	\$13	\$(400,000)
			\$(600,000)

Charts, Sparklines, and Data Bars



Adding Sparklines and Data Bars

- Both convey graphical information about worksheet data without occupying a lot of space

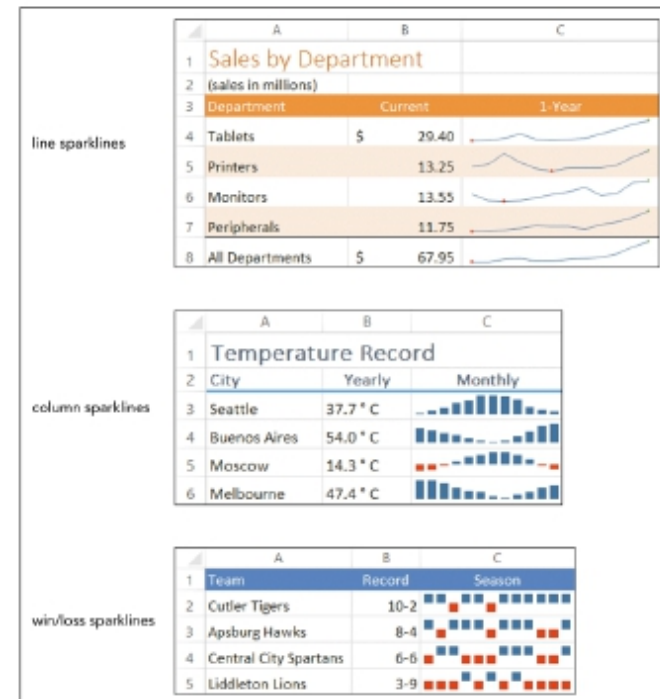
Creating Sparklines

- A mini chart displayed within a worksheet cell
 - Compact in size; doesn't include chart elements
 - Goal is to convey maximum amount of graphical information in a very small space
 - Can be grouped or ungrouped
 - Grouped sparklines share a common format
 - Ungrouped sparklines can be formatted individually
-

Types of Sparklines

- Line sparkline
 - Highlights trends
- Column sparkline
 - For column charts
- Win/Loss sparkline
 - Highlights positive and negative values

Figure 4-36 Types of sparklines

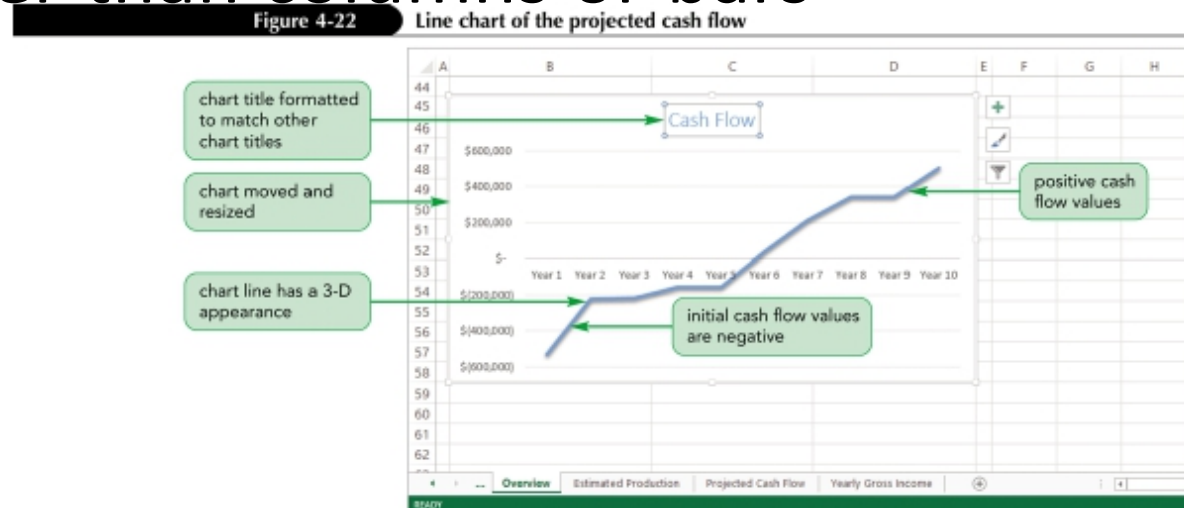


Adding and Formatting Sparkline Markers

- Can specify only line color and marker color
- Can create line markers for highest value, lowest value, all negative values, first value, and last value
- Can create markers for all data points regardless of value or position in data source
- Can add an axis to a sparkline – horizontal line that separates positive and negative values

Creating a Line Chart

- Use when data consists of values drawn from categories that follow a sequential order at evenly spaced intervals
- Displays data values using a connected line rather than columns or bars



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Projected Revenue and Expenses

10-Year Production

revised scale of the value axis

location where the horizontal and vertical axes meet

major tick values spaced at 250,000 intervals

value axis ranges from 0 to 1,750,000

Format Axis

AXIS OPTIONS

Horizontal axis crosses

Automatic

Axis value

Maximum axis value

Display units

Show d

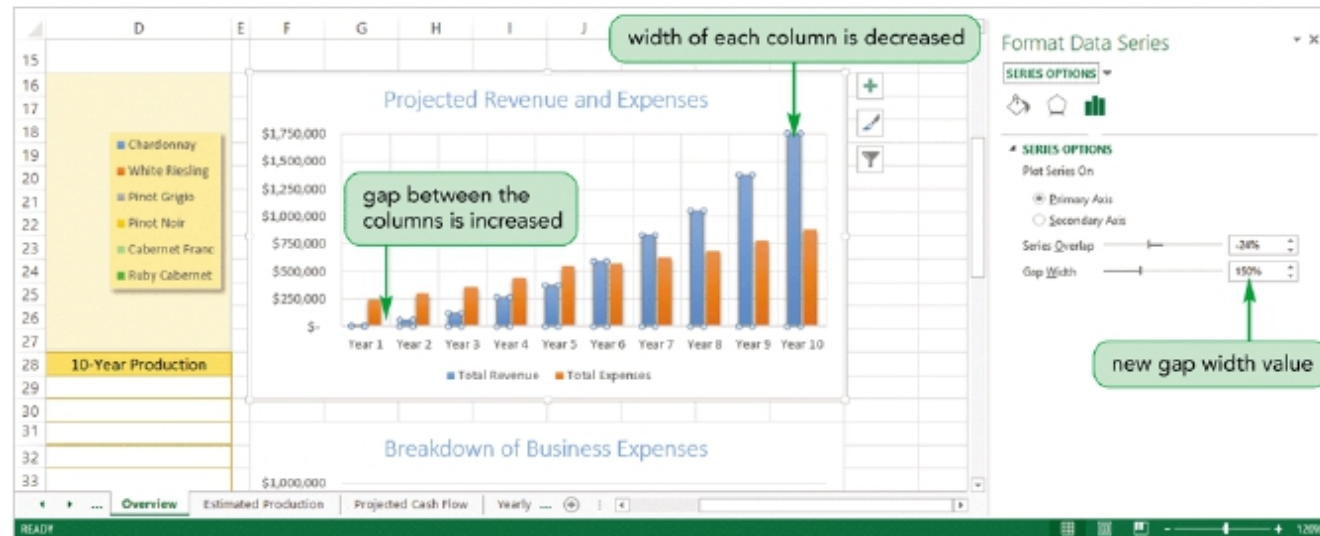
Logarithm

Formatting the Chart Columns

- Columns usually have a common format – distinguished by height, not color

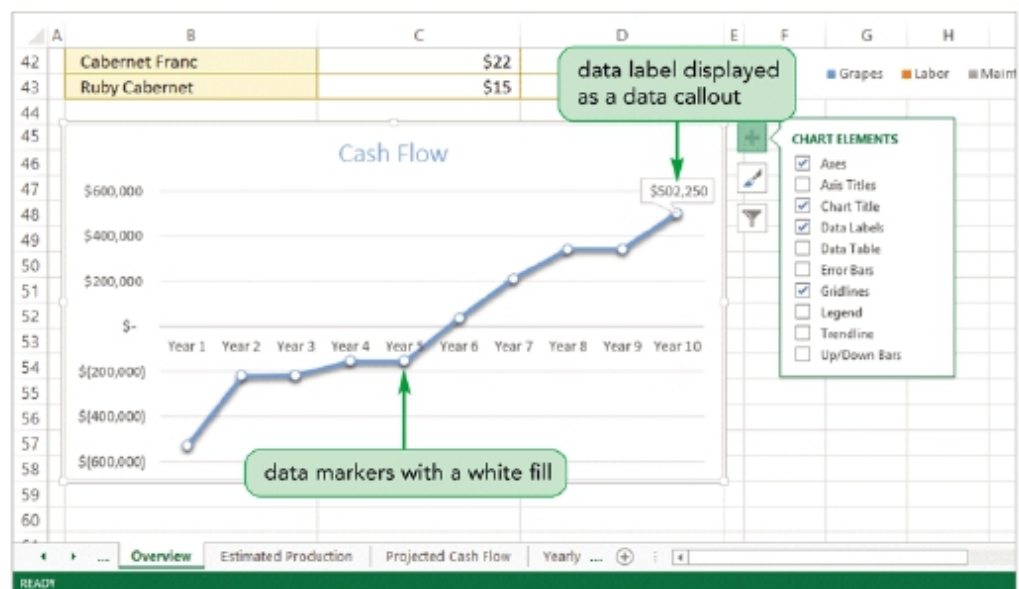
Working with Column Widths

Figure 4-25 Gap width between columns



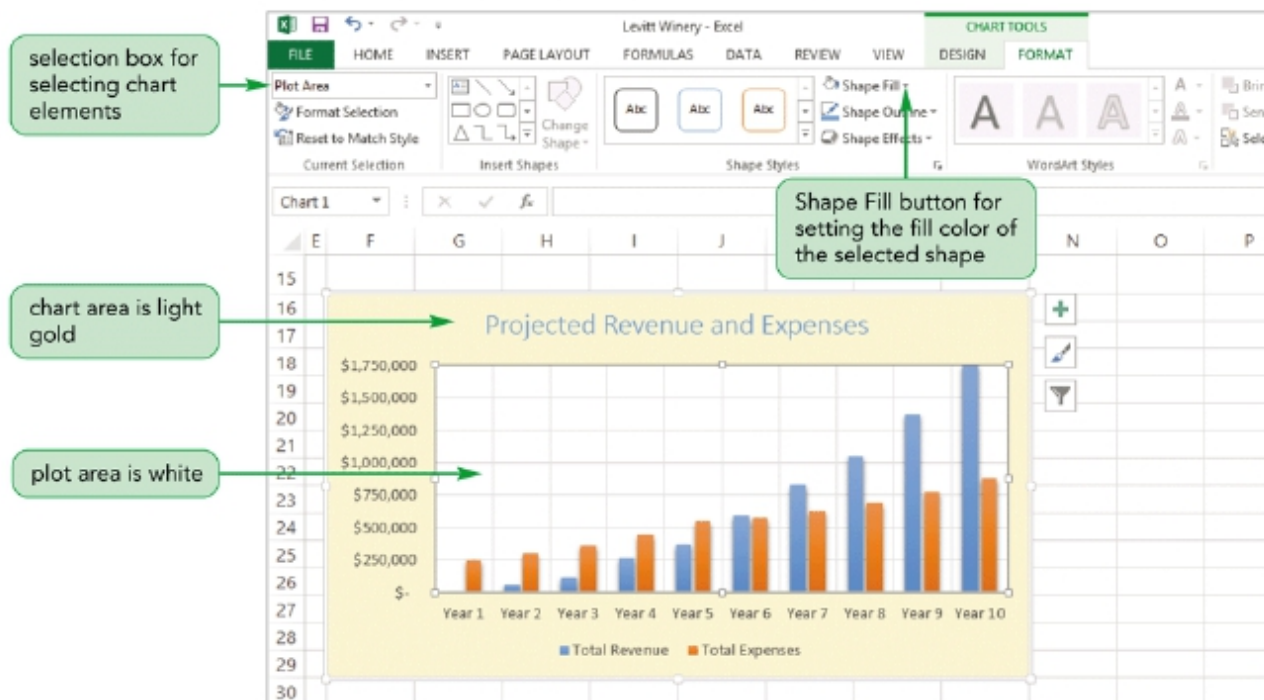
Formatting Data Markers

Figure 4-26 Formatted data markers and data label



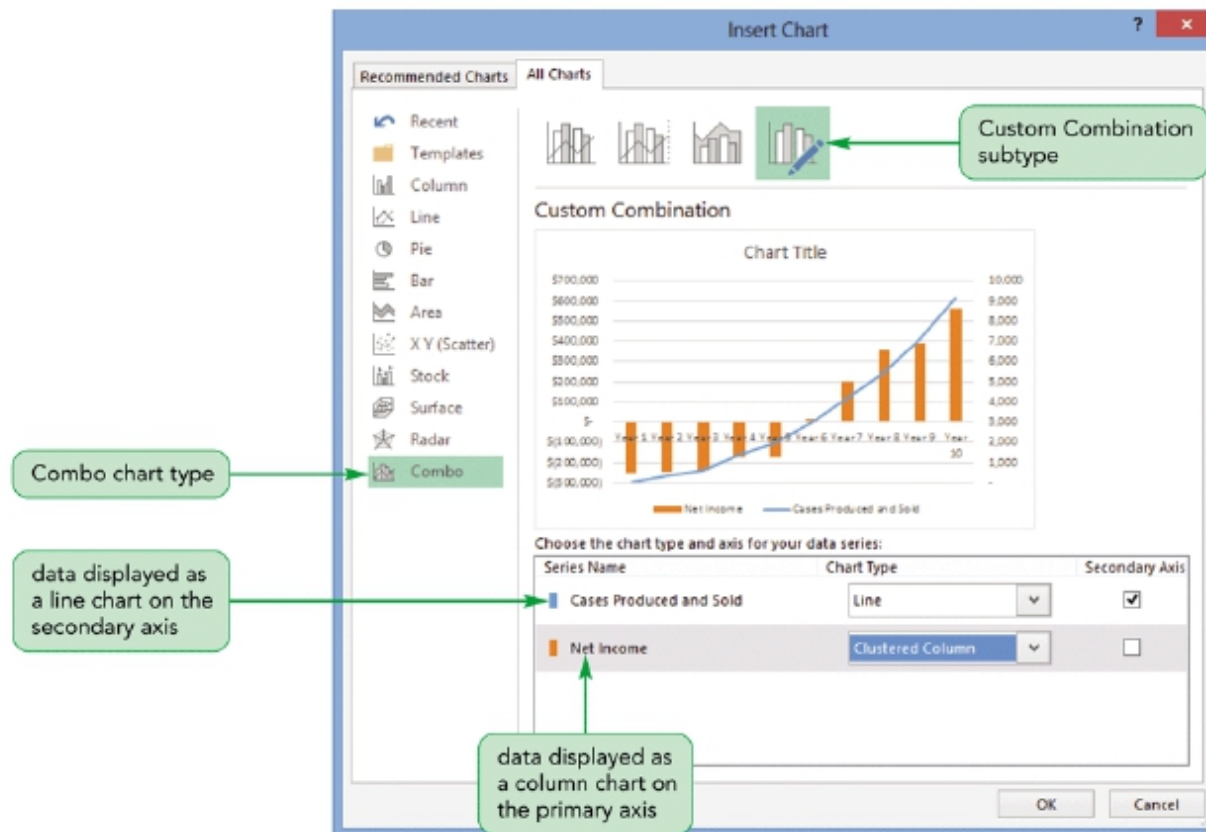
Formatting the Plot Area

Figure 4-27 Final Projected Revenue and Expenses chart



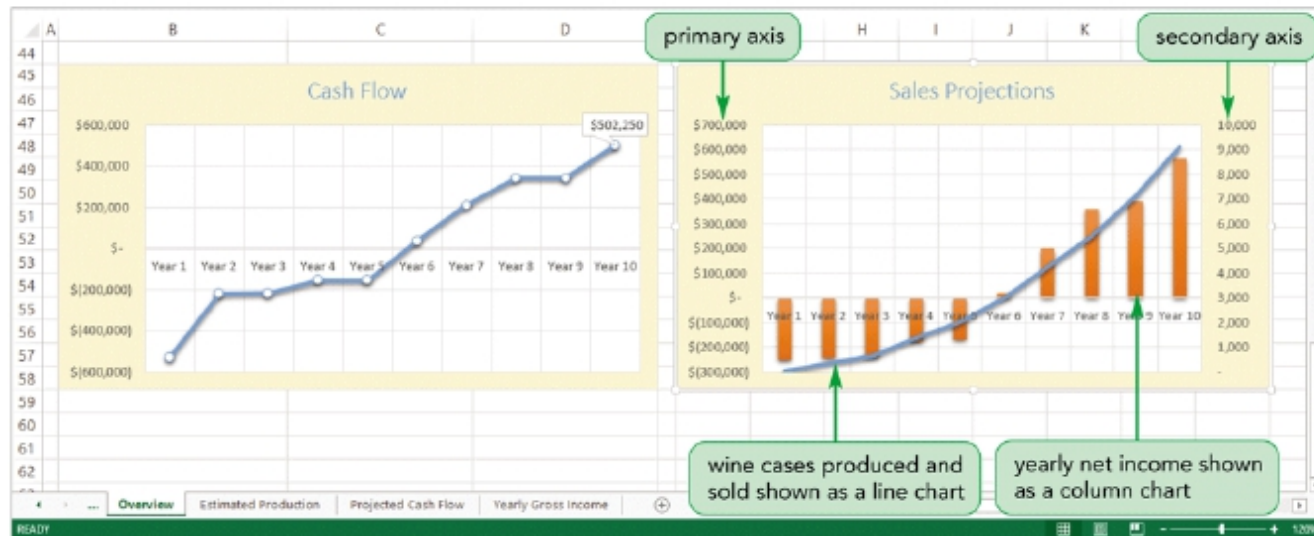
Creating a Combination Chart

Figure 4-29 Combo chart type



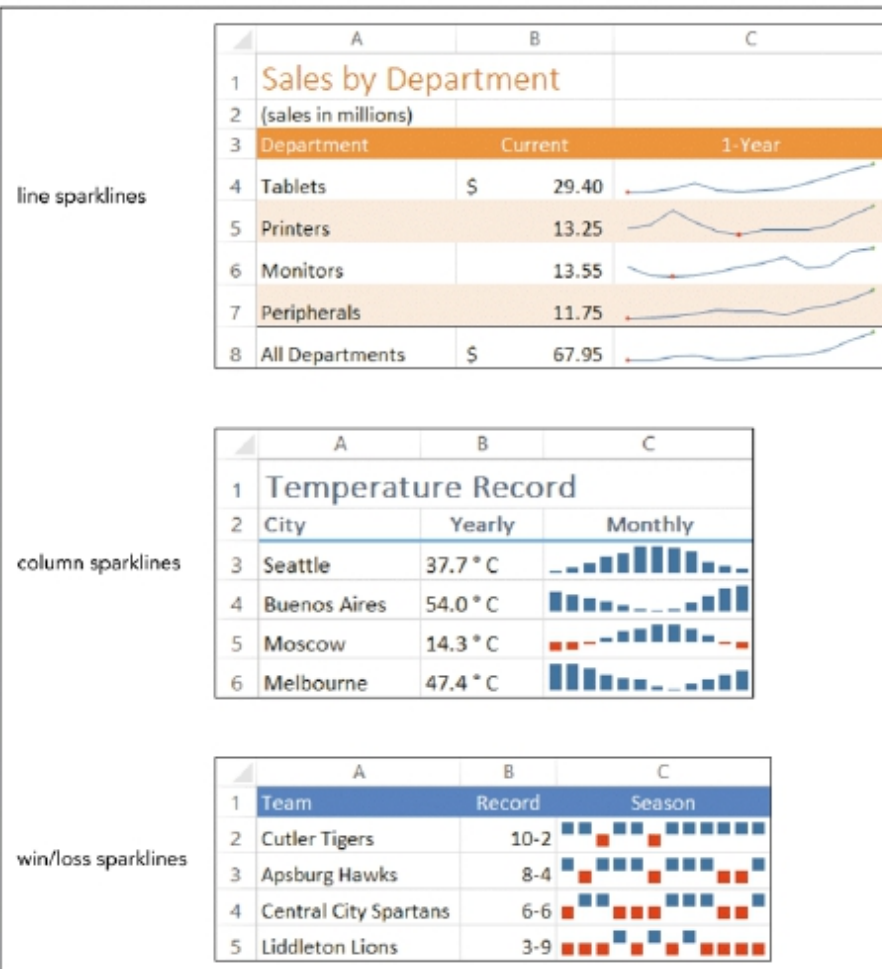
Combo Chart Example

Figure 4-30 Initial Sales Projections combination chart



Creating Sparklines

Figure 4-36 Types of sparklines

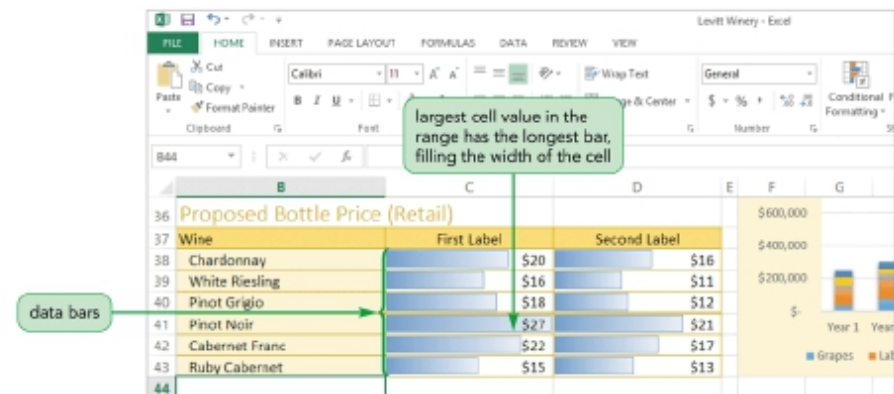


Creating Data Bars

- Conditional format that adds a horizontal bar to background of a cell containing a numeric value
 - Length based on value of each cell in selected range
- Dynamic
 - Lengths of data bars automatically update if cell's value changes

Figure 4-39

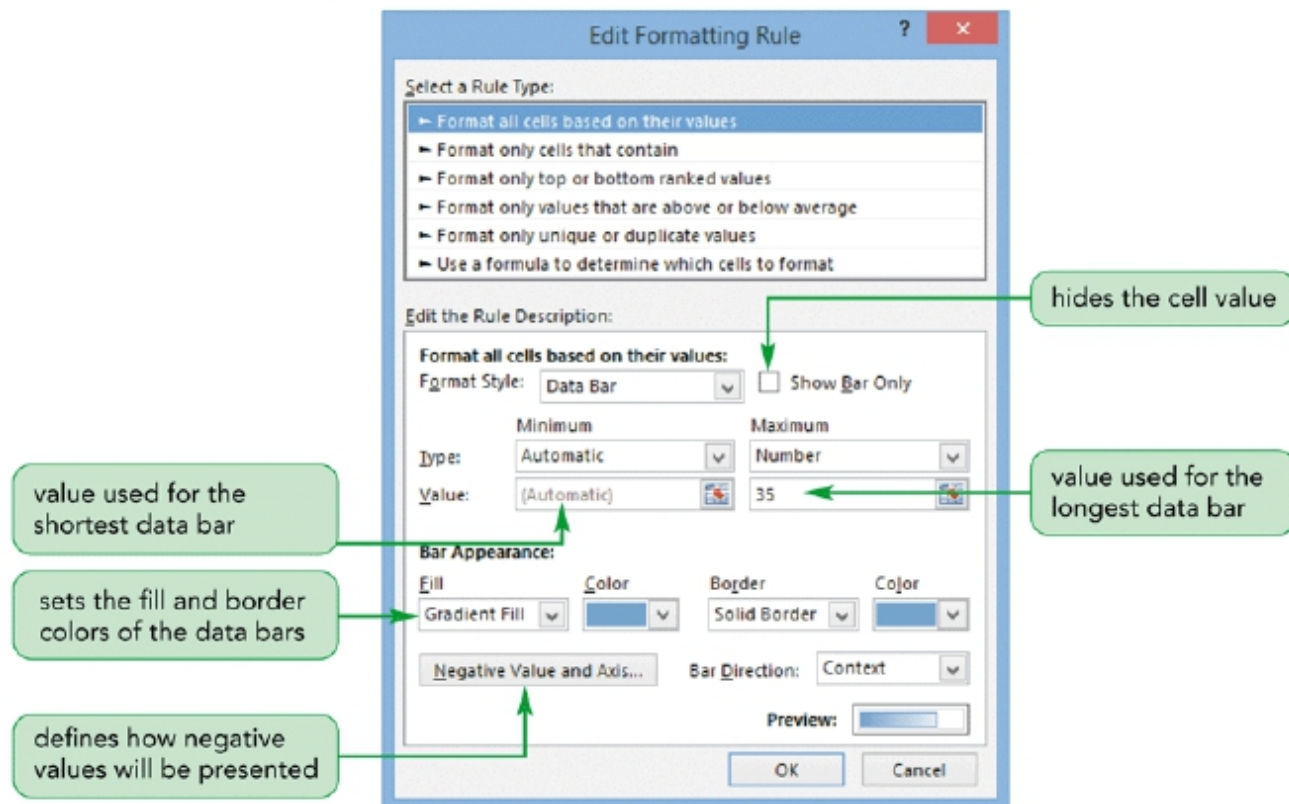
Data bars added to the Overview worksheet



Modifying a Data Bar Rule

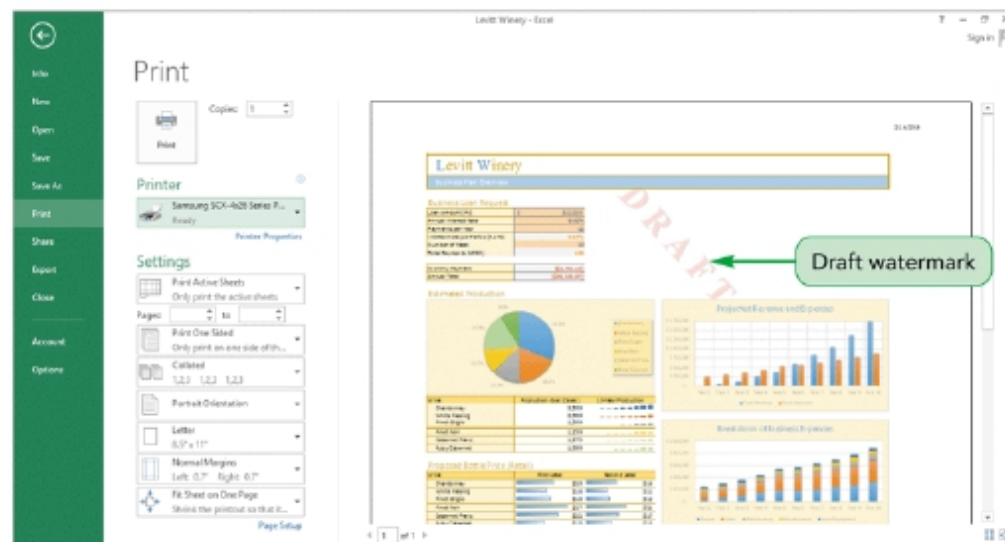
- Alter rules of the conditional format

Figure 4-40 Edit Formatting Rule dialog box



Inserting a Watermark

Figure 4-43 Print preview of the worksheet with the watermark



Watermark courtesy of Patrick Carey